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In January 2012, the Chairman of the Joint Chiefs of Staff published the Joint Operational Access Concept (JOAC) which describes the military problem that future joint forces will face as "opposed operational access in an advanced antiaccess/area-denial environment." The JOAC further asserts that mission command is the preferred command and control style to achieve the cross-domain synergy necessary to overcome the difficulties posed by an antiaccess/area-denial environment. The first portion of this paper briefly describes the antiaccess/area-denial (AA/AD) problem. The second section examines mission command through the lens of service doctrine. The next section looks at other historic approaches to command and control which may provide a Joint Force Commander insight into different ways to arrange a joint force command and control system. The fourth section examines joint force command and control and identifies problems associated with reconciling decentralized military operations with centralized and highly technical military operations. Finally, it concludes by asserting that while mission command provides some unique advantages in an AA/AD environment, a one-size fits all approach to command and control may not be enough to synchronize the effects to achieve cross-domain synergy.

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Mission Command and Antiaccess/Area-Denial: Implications for Joint Command and Control

by

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LCDR, USN

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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20 May 2013

Abstract

In January 2012, the Chairman of the Joint Chiefs of Staff published the Joint Operational Access Concept (JOAC) which describes the military problem that future joint forces will face as "opposed operational access in an advanced antiaccess/area-denial environment." The JOAC further asserts that mission command is the preferred command and control style to achieve the cross-domain synergy necessary to overcome the difficulties posed by an antiaccess/area-denial environment.

The first portion of this paper briefly describes the antiaccess/area-denial (AA/AD) problem. The second section examines mission command through the lens of service doctrine. The next section looks at other historic approaches to command and control which may provide a Joint Force Commander insight into different ways to arrange a joint force command and control system. The fourth section examines joint force command and control and identifies problems associated with reconciling decentralized military operations with centralized and highly technical military operations. Finally, it concludes by asserting that while mission command provides some unique advantages in an AA/AD environment, a one-size fits all approach to command and control may not be enough to synchronize the effects to achieve cross-domain synergy.

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Introduction

In January 2012, the Chairman of the Joint Chiefs of Staff (CJCS) published the Joint Operational Access Concept (JOAC) which cogently describes the military problem that future joint forces will face as "opposed operational access in an advanced antiaccess/area-denial environment."[1] In other words, warfare will be tougher as the United States no longer possesses a decisive advantage in all domains of warfare. Countries such as China have the ability to not only deny significant areas to American freedom of movement in future conflicts, but they can challenge American access to a theater of operations. The JOAC's prescription for the antiaccess/area-denial (AA/AD) problem is the idea of cross domain synergy which the JOAC defines as the "complementary vice merely additive employment of capabilities in different domains such that each enhances the effectiveness and compensates for the vulnerabilities of the others--to establish superiority in some combination of domains that will provide the freedom of action required by the mission."[2] The JOAC asserts that mission command is the preferred command and control (C2) style to achieve cross-domain synergy in a communication-degraded environment likely to be encountered in an AA/AD scenario.[3] Questions remain however, if mission command is capable of creating the synergies across the maritime, air, land, cyber, and space domains, whether individual service cultures can adjust to the decentralized approach envisioned in the JOAC, and whether a Joint Task Force (JTF) can integrate in such a way to create cross-domain synergy. The author argues that while mission command does provide some unique characteristics that will provide an advantage in an AA/AD environment, a future Joint Force Commander (JFC) must consider all approaches to C2 and will have to account for service-driven approaches to C2 in order to create the synergies described in the JOAC.

The author briefly describes the AA/AD problem. He then looks at mission command and how service and joint doctrine address C2. This section is followed by a description of historic approaches to C2 that may provide insight into how to conduct C2. In the analysis section, the author discusses how mission command is not enough to synchronize decentralized military capabilities in the maritime, land and air domains with the centralized approaches that will likely emerge with the space and cyber space domains in an AA/AD scenario and that other approaches to C2 must be considered by a JFC. This section is followed by the conclusion and recommendations.

The Anti-Access/Area-Denial Problem and Cross-domain Synergy

There has been much written over the last decade about the emerging AA/AD threats facing the United States. Put into the context of recent United States history, cold-war ideas such as AirLand battle have given way to AirSea battle as perceived threats to United States interests have shifted from the Soviet bloc to the Pacific.[4] The AA/AD debate has also been rising in prominence as the United States has divested itself of certain cold war-developed long-range area denial-type weapons systems such as the Tomahawk Anti-Ship missile and the AIM-54 Phoenix missile for various reasons in favor of new technologies albeit with shorter ranges.

China is emerging as a peer competitor with the United States based partly upon perceived AA/AD challenges to United States power. Events such as the deployment of the DF-21D medium-range anti-ship ballistic missile are contributing to this perception.[5] This deployment however, still does not answer basic questions of whether the technology in the missile will even work against a maneuvering target such as an aircraft carrier or whether China has built and integrated the requisite "kill chain" required to find, track, target, and

attack an aircraft carrier.[6] Whether the DF-21D is a real threat or just a paper tiger adding to Chinese strategic indirection is debatable.[7] Other trends that show Chinese commitment to an AA/AD strategy include the development and fielding of advanced stealth-like aircraft, naval modernization including both the modernization of a sizable submarine force relatively equivalent in numbers to the United States Pacific Fleet and the development of an aircraft carrier, the acquisition of various long range anti-ship cruise missiles, and the development of a prominent cyber capability.[8]

These trends are compatible with China's quest to develop a robust anti-satellite capability. It has been suggested that China seeks to further its anti-satellite program, which successfully tested an anti-satellite capability in 2007 and 2010 against low earth orbit satellites, by testing a hi-altitude anti-satellite capability.[9] A hi-altitude anti-satellite capability would significantly threaten United States space-based navigation, communication, and intelligence, surveillance, and reconnaissance (ISR) capabilities.[10] The military problem that is emerging is how to employ troops in this complex operating environment where the United States may not enjoy technological superiority.

A Focus on Mission Command

The JOAC describes mission command as the favored command approach to achieve cross-domain synergy.[11] As discussed in the CJCS white paper on mission command, the underlying principles of mission command, which include understanding commander's intent, the delivery of mission type orders and decentralized execution are not novel concepts.[12] These principles have emerged as long-standing solutions to recurring problems inherent in military command.

All of the services address elements of mission command in their doctrinal publications, however, variations in service doctrine on C2 are important to note because they reveal subtle differences in how service culture may influence the practice of joint force mission command. The discussion of culture is important as Milan Vego claims that the main purpose of doctrine is to inculcate a common philosophy, a common language, a common purpose, and unity of effort.[13] Organizational theorists such as Edgar Schein would likely claim that those elements that Vego mentions are part of the shared history that defines an organization's culture.[14] Understanding cultural views of C2 will also likely indicate the "mental models" that will limit thinking involved in establishing joint C2 structures.[15]

The Army is clearly dedicated to mission command and has shifted away from addressing other approaches in their doctrinal publications. As stated in the introduction of Army Doctrinal Reference Publication (ADRP) 6-0, the Army has favored mission command over detailed command since the 1980s.[16] Army doctrine has all but removed detailed command from its command doctrine, relegating the discussion to two sentences in the introduction of ADRP 6-0 and stating that history has clearly shown the advantages of mission command in the conduct of military operations.[17] Army Doctrinal Publication (ADP) 6-0 does not even address detailed command.[18] This is an evolution from the 2003 version of Field Manual 6-0 that addressed detailed command more thoroughly.[19] Current Army doctrine describes mission command in terms of a command philosophy of "exercising authority and direction using mission orders to enable disciplined initiative within the commander's intent to empower agile and adaptive leaders in the conduct of unified land operations."[20] Mission command is executed through what is called the mission command warfighting function which assigns tasks to the commander and staff.[21] The additional tasks

identified in ADRP 6-0 include airspace control, military deception, network operations, civil affairs operations, and information protection.[22] These additional tasks are also areas which may require more detailed control in some circumstances.

Air Force doctrine is somewhat different. Air Force Doctrine Document (AFDD) 6-0 states that "centralized C2 of air and space forces under a single airman is a fundamental tenet of Air Force doctrine."[23] It further states that "unity of command is a principle of C2 which in turn, assures unity of effort and is supported by the tenets of centralized control and decentralized execution."[24] Despite this focus on centralization and unity of command, Air Force doctrine does address mission command as a form of furthering implicit communication. Specifically, AFDD 6-0 states that "two joint C2 concepts that nurture implicit communications are commander's intent and mission-type orders. By expressing intent and direction through mission-type orders, the commander attempts to provide clear objectives and goals to enable his/her subordinates to execute the mission."[25] Thus, while Air Force doctrine does emphasize centralized command, it does accommodate for mission command executed in joint C2 with commander's intent, mission-type orders, and decentralized execution, although the "how" to conduct a mission is likely communicated centrally, thus eliminating some of the initiative inherent in mission command.

Like Army doctrine, Navy doctrine has shifted away from a discussion of detailed command. The Navy has consolidated its high-level doctrinal publications into one volume released in 2010. Naval Doctrinal Publication (NDP) 1 describes a preference for centralized planning and decentralized execution with focus on subordinate's understanding of the commander's intent in order to facilitate decentralized operations with a complex assortment of forces from other services and nations.[26] The naval approach highlights the service's

preference for high-level planning, coupled with decentralized execution and initiative characteristic of the independent nature of naval operations. Navy C2 doctrine has changed from a more in-depth description of C2. NDP 6, published in 1995 described a continuum of detailed control to mission control, where detailed control offered "explicit orders and plans" in which orders are clear and action required is unambiguous. [27] Detailed control emphasizes a vertical hierarchy where "information flows up the chain of command and orders flowing down the chain of command."[28] It is mentioned that detailed control works well in certain circumstances, such as the tactical positioning of ships, but does not work "in a rapidly changing situation with great uncertainty."[29] On the other hand, mission control was described as "decentralized and flexible. . . . [where] orders and plans are succinct. . . . [and] emphasizing horizontal communication among subordinate commands."[30] In mission control, "the command guides the actions of subordinates by imparting an understanding of mission requirements, [and] then allows them freedom of action."[31] At the tactical level, the Navy operates within a mission-type framework emphasizing decentralized action to address complexities posed in the operating environment in the Composite Warfare Commander's (CWC) concept.[32] Command by negation (a type of selective control which will be discussed later) has emerged at the tactical level in order to deal with complexities and time constraints of modern warfare while preserving the senior commander's ability to take action.

Marine Corps doctrine has remained relatively unchanged since the mid-90s. Marine Corps Doctrinal Publication (MCDP) 6-0 describes the fundamental tension in C2 as the pursuit of "certainty as the effective basis for command and control or to accept uncertainty as a fact and to learn to function in spite of it."[33] MCDP 6 describes the spectrum between

detailed C2 which is characterized as 'coercive' and mission C2 which is characterized as 'spontaneous'.[34] While Marine Corps doctrine admits that no one commander will remain static in his approach to C2, it unequivocally favors mission C2 as a primary approach to maneuver warfare.[35] MCDP 6-0 defines mission C2 as "the use of *mission tactics* in which seniors assign missions and explain the underlying intent, but leave subordinates as free as possible to choose the manner of accomplishment. . . . [where] commanders seek to exercise a sort of command by influence, issuing broad guidance rather than detailed directions or directives."[36] This 'philosophy of command' has been inculcated at all levels of the Marine Corps and its static nature has likely fed into the fundamental ethos of the Marines and certainly the Marine's shared organizational history.[37] In the Marine Air Ground Task Force construct, the Marine Corps has historically taken a scalable systems approach to create cross domain-synergy in the land domain where initiative is carefully balanced with detailed control.

There are limitations to mission command. The Capstone Concept for Joint Operations: Joint Force 2020 aptly notes, "that while mission command is the preferred command philosophy, it is not appropriate to all situations. Certain specific activities require more detailed control, such as the employment of nuclear weapons or other national capabilities, air traffic control, or activities that are fundamentally about the sufficient synchronization of resources."[38] The CJCS white paper on mission command asserts that while there are phrasing variations in service doctrine concerning mission command, they convey the same ideas.[39] As has been shown, this statement however is not entirely accurate.

The Army has completely adopted mission command as the sole approach to command while questions remain on how to integrate other capabilities that will potentially

require a more detailed approach. The Army has done this simultaneously with its shift to the Brigade Combat Team, which complements a more decentralized approach. Air Force doctrine, while stressing decentralized execution could easily result in centralized C2, especially in the Air Tasking Order (ATO) process. The resultant centralization could occur with low-level failure to execute mission sorties requiring a high-level shifting of priorities or tasking of other organizations at a high level to cover gaps in the centralized plan. Additionally, Air Force doctrinal insistence of unity of command under a single airman may take the form of centralizing the communication of the way (how) to complete the mission which could be in conflict with mission command principles. The naval approach emphasizes centralized planning coupled with decentralized execution and the importance of commander's intent and initiative. The CWC concept and associated 'command by negation' reinforces a decentralized approach with complex technological systems. Command by negation however, could also provide the framework for more detailed control when the circumstances warrant. Similarly, the Marine Corps has emphasized mission C2 for decades, however Marine doctrine recognizes that detailed C2 may at times be necessary and leaves that option available. A study of alternate approaches to C2 may provide some insights and patterns in how a JFC may be able to reconcile the tensions between detailed and mission command.

Other Approaches to C2

Alberts and Hayes describe some research conducted in the 1980s in which different theater C2 systems were studied from successful post World War II militaries.[40] Their research identified three major types of command systems (differentiated by the orders that they produced) with two important subtypes which are summarized in Table 1.[41] The

column “order specificity” addresses the relative detail inherent in their orders. These range from ‘mission-specific’ (little detail, analogous to mission command) to the very detailed ‘order-specific.’[42] The current shift to mission command in United States military circles reflects the shift from the traditional approach of the issuing orders for two-levels down the chain (what Albert and Hayes describe as ‘objective-specific’) to the less-detailed ‘mission-specific’ where the "how" is left for the subordinate to orchestrate. The column “C2 capacity” addresses the relative capacity required of the C2 system to effectively process information and make decisions. The two "updates" columns reflect the detail and periodicity required for information flow and decision making in the C2 system and the “competency” column reflects the professional competency required of military forces while the “initiative” column reflects the initiative allowed for subordinate action.

Orders Specificity Type	**Command Approach Sub-type**	**Example**	**C2 capacity**	**Detail of updates**	**Frequency of updates**	**Competency required**	**Initiative required**
Mission specific	Control free	German Blitzkrieg	Very low	Low	Low	Very High	Very High
Mission specific	Selective control	Israeli Army 1956, 1967, 1973	Low	Low	Very High	High	High
Objective specific	Problem bounding	British Army	Medium	Medium	Medium	High	High
Objective specific	Problem solving	Post WW II U.S. Army and Navy	High	Medium	Medium	Medium	Medium
Order specific	Interventionist	Post WW II Soviet	Very High	High	Very High	Medium/Low	Low
Order specific	Cyclic	Post WW II PLA, USAF ATO	High	High	Very Low	Low	Very Low

Table 1, Comparison of Different Approaches to C2 [43]
Source: David Alberts and Richard E. Hayes, *Command Arrangements for Peace Operations* (Washington D.C.: CCRP Publication Series, 1995), 68 and 74.

Of Alberts and Hayes' six subtypes, the orders specificity and initiative required of ‘control-free’ and ‘selective-control’ approaches are the closest to mission command.[44] The example given for the control free approach is that of the German blitzkrieg in World War II in which in many occasions, the opponent barely realized they were being attacked.[45] Alberts and Hayes remark that the Israeli's developed a similar approach of issuing mission-type orders and expecting battlefield initiative, but their higher headquarters observed the action in detail and were prepared to take more detailed control in case of a major hazard to the operation or an opportunity presented itself in a manner in which the subordinate was unable to act.[46] As seen in Table 1, the frequency of updates in selective control must be very high so that higher headquarters can have awareness of battlefield realities.

Alberts and Hayes describe the ‘objective-specific’ approach as the approaches developed by the relatively resource-rich ‘attritional models’ of the United States and United Kingdom in which there is greater coordination between superior and subordinate and there is a focus on synchronization.[47] In the ‘problem-bounding’ approach, "the higher headquarters tends to compose their directives in terms of the objectives to be accomplished, but to couch them in very general terms.”[48] Similarly, in the ‘problem-solving’ approach, "missions and objectives are articulated for two levels of subordinates and substantial guidance about how the objectives are to be achieved is also included."[49]

In the ‘orders-specific’ centralized systems, orders are typically issued by higher headquarters several echelons above.[50] In the ‘interventionist’ approach exemplified by the Soviet system, centralized directives were given with very detailed control requiring frequent updates and detailed reporting from subordinates at least two levels down.[51] In the ‘cyclic’ approach exemplified by the Post World War II Chinese Army (and by the USAF ATO

system ostensibly for resource management and complexity considerations), high-level headquarters centralize the orders-issuing process" to all subordinates, but does so on a preset cycle time."[52] As a centralized approach, the cyclic approach does free up C2 capacity at the expense of time and flexibility which has implications for an AA/AD scenario.

Alberts and Hayes mention that "all six approaches have been successful, but each is more important for some types of warfare than others."[53] While it is important to note that these historic approaches to C2 may be optimal for a complex, network-enabled battlefield where situational awareness and information is ubiquitous, applying some of these historic patterns to C2 may help resolve some of the issues likely to be encountered in an AA/AD scenario. For instance, it is conceivable in an AA/AD confrontation that a JFC could have some elements utilizing a centrally-planned cross-domain synergistic control-free approach to capture a pocket of physical space based upon an expectation that communication will not be available and the speed of surprise and flexibility is critical. Simultaneously, another element could be utilizing a hastily-planned selective-control approach being heavily influenced by the adversary's response and higher headquarters ability to integrate space, cyber, ballistic missile defense, and process information flows to nest within a larger operation with political constraints and restraints. This element may be loosely connected with low-bandwidth communication networks with pre-planned responses if communication is lost. Another element of this joint force could be using a more-nuanced problem-bounding approach in which the mission is described in general terms and defined more by conditions describing a desired end-state or merely effects, but the order specificity is detailed enough to coordinate lower level actions based upon political or cultural sensitivities. This higher-level of detail may be driven by a collaborative interagency approach that seeks to leverage

interagency synergy. Simultaneously, as safe, alternate theater access areas are secured, a more cyclic, steady state system could emerge in order to manage the build-up of forces and materials where time and flexibility give way to efficiency with limited resources. As coalition actors are integrated into this joint force, their command authorities may desire an interventionist approach to overcome language, political, and cultural difficulties and to ensure their accomplishment of primary or supporting actions.

Joint Publication 3-0 mentions that disciplined initiative of subordinates in a mission command framework is the solution to the hazard of modern warfare of non-guaranteed access to communication.[54] However, the nature of the tasks to be completed and other factors must also feed into the calculus of how best to exercise command. A joint force executing an adaptive C2 system where a JFC and subordinate commanders, true to the principles of mission command, are delegating responsibility and communicating intent and desired end-states as much as possible, but centralizing command and detail when required in order to overcome the complexities of a challenging operating environment and the unique circumstances of the problem is likely a better approach than simply expecting that all echelons will operate in a purely mission command framework.

Mission Command and Joint Force C2

Joint doctrine is relatively clear about different command authorities that a commander may have which include combatant command, operational control (OPCON), tactical control (TACON), and support.[55] Additionally, joint doctrine has clear business rules on which commanders are supported and supporting in the maritime and land areas of operation and during maritime, land and air interdiction.[56] Despite these rules, AA/AD presents a difficult problem for a JFC. Unlike, recent conflicts where the United States was

able to systematically eliminate air defenses rather quickly and the maritime components were left relatively unchallenged thus making the Joint Force Air Component Commander (JFACC) and Joint Force Maritime Component Commander (JFMCC) supporting commanders, the AA/AD problem is much more difficult as the JFC will likely have to rotate priorities and support relationships among the Joint Force Land Component Commander (JFLCC), JFACC, and JFMCC multiple times in a conflict in order to achieve the desired effects consistent with the precepts enumerated in the JOAC. This recognition is likely driving alternative concepts such as Air-Sea Battle which seeks to integrate air, sea, cyber, and space forces to counter AA/AD challenges.[57] Despite this, joint doctrine is still relatively silent on how a JFC will C2 space and cyber forces.

With reference to the space domain, joint doctrine accounts for a joint force Space Coordinating Authority (SCA).[58] Joint doctrine also allows for direct liaison between Strategic Command component and the supported commander if authorized between the supported combatant commander and Strategic Command.[59] This relatively complicated relationship to access space capabilities for a JFC will likely complicate the accomplishment of cross-domain synergy unless the philosophy of mission command is followed and a JFC is allowed a direct liaison relationship and potentially decision rights to the agencies and Strategic Command components that possess capabilities the JFC needs. However, the allocation and prioritization of these capabilities will have to be set at a high level of command in order to nest with national priorities.

There is much work to be done for C2 in the cyberspace domain and integration into an AA/AD environment. The nascent capabilities in this domain will likely need to be vetted and rehearsed before synchronizing effects into an operational plan. While most military

organizations are users of various cyber capabilities, procedures for accessing and requesting offensive cyber 'fires' capabilities will have to be developed. Much like the SCA, there likely will need to be some sort of future offensive Cyberspace Coordination Authority in a joint force whose job would be to synchronize the cyber-fires aspects of cross-domain synergy. Adding to this complexity is that cyber capabilities may not all reside in the military adding an additional layer of complexity by adding an interagency process necessary to achieve unity of effort and making a hi-intensity AA/AD problem a centralized national priority.

Mission Command is not Enough

Van Creveld argues that "from Plato to NATO, the history of command in war consists essentially as a quest for certainty."[60] He further adds that there is "the realization that certainty is the product of time as well of information, and the consequent willingness to do with less of the latter in order to save the former. . . [is part of] a mission-oriented command system."[61] As the United States begins to understand the full implications of 21st century warfare, it must realize that the fundamentals of warfare must be integrated with the technological realities of the information age. Milan Vego has stated that information has a unique effect on the operational factors in that a "lack of information cannot be balanced by any of the three traditional operational factors."[62] In this respect, any solution to the AA/AD problem must include not only a balancing of the operational factors among the various domains in order to achieve cross-domain synergy, but an understanding of information and how it supports the C2 process. If the strategic situation is rapidly changing, mission command's light requirements may be sufficient to nest operational objectives in the strategic context. Conversely, operational-level action may require detailed control in order to

synchronize a national response. This includes the tensions inherent in integrating a decentralized command system for distributed military forces trained to seize battlefield opportunity with centralized national capabilities and information age warfare techniques, tactics, and procedures targeting diplomatic, economic, and information systems and even the population itself.

Mission command provides some unique advantages by using professional military forces in a manner that seeks to act faster than the adversary can react. However, in order to achieve cross-domain synergy as envisaged in the JOAC, a command system must be flexible enough to integrate and synchronize centralized and decentralized processes in order to achieve cross-domain synergy based upon a totality of the circumstances. By completely eliminating detailed control from doctrine, risk is accepted by not considering this approach for the narrow set of circumstances where it may work. The task of a joint commander in building up capacity to support the operational functions will likely require more than one approach to command, as the sustainment function may require a different approach than fires, protection, maneuver, or even intelligence. A JFC has to build up these functional capabilities while bringing together personnel from different service cultures and ensuring their actions complement capabilities in different domains and then be prepared to combine them with coalition forces and other government agencies.

Decentralization often allows its adherents the advantage of seizing battlefield opportunities, but a one-size fits all approach to command cannot take into account every situation and cannot possibly work for all types of battlefield synchronization. Unity of command will be a difficult task to be achieved when integrating centralized space and cyber domain capabilities. The Air Force has also recognized this reality with the coordination and

friction required to optimize the efficacy of air forces in the ATO process. The command style should be flexible enough to take into account the situation on the ground and the objectives required. Mission command offers unique advantages, but a commander must be careful not to push difficult problems down the chain to a level that may not be able to synchronize the necessary cross-domain effects. At times, higher commanders may need to reach down for detailed control when the strategic or operational environment changes faster than the tactical or when higher cannot communicate intent and end state quick enough to ensure timely action (failure mode of mission command). Hi-assurance multi-domain simultaneous action may also require more detailed control as well as the management of military forces in a resource-constrained environment.

Conclusion

The challenges of operational C2 in an AA/AD scenario will be integrating the initiative-driven elements that thrive on mission command with more centralized elements that rely on different control mechanisms. The goal will be making a C2 system that is flexible enough to take advantage of the benefits of mission command while still enabling the efficient use of all resources. Understanding the cultural differences that emerged separately from the individual service's history and leveraging the advantages offered by these different perspectives while overcoming limitations that each approach brings is a monumental task. By understanding these differences and understanding different approaches to C2, the JFC will be able to apply some rules-of-thumb in order to resolve some of the problems that will arise when confronting some of the unknowns in an AA/AD environment.

Mission command is important to ensure the success of military forces, but the realities of the modern age is that there will likely always be constraints and restraints that

will guide subordinates in the how to conduct a mission, especially when the politics of escalation are involved. Part of dealing with these limitations is in the art of command and the communication of commander's intent, but control that is more detailed may have to be exerted, especially in ad-hoc or hastily-formed organizations where a reservoir of trust has not been built. Additionally, a commander must carefully weigh the options for detailed control in a resource-constrained environment with the need for efficient use of resources. The commander may choose to exert indirect control in limiting the options available to subordinates communicated via commander's intent or a more explicit approach may be taken. In selecting an appropriate level and approach to command, factors such as who has the best information, who has the most robust communication capability, and at what level risk decisions are made all contribute to resolving the tensions in C2 in an AA/AD scenario.

Recommendations

Regular professional military education and training is important in teaching skills and critical thought necessary to create an adaptable C2 system, but unless personnel are introduced to alternative forms of C2 at an early stage in their careers, they will likely carry some of the cultural baggage associated with service doctrine.[63] Mission command prepares the military for the worst case of complete communication denial in AA/AD by leveraging American military professionalism, but it assumes America will cede the technological advantage to an adversary, and not project the operational function of protection to essential C2 infrastructure. Training to mission command's low bandwidth requirement is wise, but modern C2's heavy reliance on communication networks should also drive the development of alternatives to satellite communication, such as low-bandwidth high frequency networks and other technologies for over the horizon communication.

Notes

1. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Joint Operational Access Concept (JOAC) Version 1.0* (Washington, D.C.: CJCS, 17 January 2012), 14.

2. Ibid.

3. Ibid., 28. The JOAC defines mission command as "the conduct of operations through decentralized execution based upon mission-type orders."

4. Andrew F. Krepenevich, "Why AirSea Battle?" Center for Strategic and Budgetary Assessments, 2010, accessed 18 May 2013, http://www.csbaonline.org/wp-content/uploads/2010/05/2010.05.18-AirSea-Battle.pdf, 2.

5. Sarah Mishkin and Kathrin Hille, "China deploys anti-ship missile off Taiwan," *Financial Times*, 19 April 2013, accessed 25 April 2013, http://www.ft.com/intl/cms/s/0/3d026ec6-a8d1-11e2-a096-00144feabdc0.html#axzz2RZdlZ2gh. The Dong Feng-21D (DF-21D) anti-ship ballistic missile is one of the more prominent weapons in the Chinese arsenal as it relates to antiaccess/area-denial. This medium-range ballistic missile is reputed to be able to accept a mid-course correction and potentially hit a maneuvering target at sea. The clear implication is that it could target and possibly hit an aircraft carrier, long considered a critical strength in American power projection in the Pacific region. Anti-ship missiles have been a factor in naval planning for many decades, however, the magnitude of capabilities associated with an anti-ship ballistic missile which include extremely-long range and speed are relatively new problems in naval warfare and significantly affect risk associated in an engagement with China. The deployment of the DF-21D is significant as it is likely emerging as a Chinese deterrent option to counter American action, especially as it relates to Taiwan.

6. Michael J. Cole, "The DF-21D or 'Carrier Killer': An Instrument of Deception?," *The Diplomat*, 22 April 2013, accessed 25 April 2013, http://thediplomat.com/flashpoints-blog/2013/04/22/the-df-21d-or-carrier-killer-an-instrument-of-deception/.

7. Ibid.

8. Mackenzie Eaglen and Jon Rodeback, "Submarine Arms Race in the Pacific: The Chinese Challenge to U.S. Undersea Supremacy," The Heritage Foundation, 2 February 2010, accessed 2 March 2013, http://www.heritage.org/research/reports/2010/02/submarine-arms-race-in-the-pacific-the-chinese-challenge-to-us-undersea-supremacy ; Michael Chase, "Not in Our Backyard: "China's Emerging Anti-Access Strategy," Progressive Policy Institute, October 2012, accessed 5 March 2013, http://www.progressivefix.com/wp-content/uploads/2010/10/2010_CHASE-China-Not-in-our-backyard.pdf.

9. Andrea Shalal-Esa, "China's space activities raising US satellite security concerns," *Reuters*, 14 January 2013, accessed 22 April 2013, http://www.reuters.com/article/2013/01/14/china-usa-satellites-idUSL2N0AJ10620130114.

10. Ibid.

11. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Joint Operational Access Concept (JOAC) Version 1.0*, 28.

12. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Mission Command White Paper.* (Washington D.C., CJCS, 03 April 2012), 3.

13. Milan N. Vego, *Joint Operational Warfare: Theory and Practice,* (Newport: United States Naval War College, 2007), XII-3.

14. Edgar H. Schein, *Organizational Culture and Leadership* (San Francisco: Wiley, 2004), 17. Schein defines the "culture of a group. . . as a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems (17)." This shared history or culture, according to Schein can be analyzed from three different levels: the visible organizational structures and processes which can are observed, but may be hard to understand, espoused beliefs and values such as goals, philosophies [doctrine], and underlying assumptions which he describes as "unconscious, taken-for-granted beliefs, perceptions, thoughts, and feelings.(26)." If the theory that shared history is what defines culture is correct, then "joint culture" will be at a severe disadvantage when compared to "service culture" as the individual services are responsible for the manning, training, and equipping of military forces. It is in these service-driven tasks that shared organizational history will be experienced since joint tours of duty are often brief interludes in a military career.

15. Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (New York: Doubleday 1990), 174. Peter Senge discusses how 'mental models' are often the reason why "new ideas fail to get put into practice because they conflict with deeply held internal images of how the world works, images that limit us to familiar ways of thinking and acting." These mental models would influence how military personnel would setup and view the command and control function. This is an important consideration as the joint force is composed of military personnel whose ideas were formed within their individual services early in their careers.

16. U.S. Army, *Mission Command. Army Doctrinal Reference Publication (ADRP) 6-0,* (Washington, D.C.: Headquarters, Department of the Army, May 2012), v.

17. Ibid, v.

18. U.S. Army, *Mission Command. Army Doctrinal Publication (ADP) 6-0* (Washington D.C.: Headquarters, Department of the Army, May 2012).

19. U.S. Army, *Mission Command: Command and Control of Army Forces, Field Manual (FM) 6-0* (Washington, D.C.: Headquarters, Department of the Army, August 2003), 1-14.

20. U.S. Army, *Mission Command. Army Doctrinal Reference Publication (ADRP) 6-0*, 1-3.

21. Ibid., 3-1. ADRP 6-0 describes tasks associated with the commander and staff. Additionally, it has generic guidance on additional tasks such as military deception, civil affairs operations, network operations, information protection, and airspace control. A discussion of these additional tasks is interesting as the implication of these additional tasks is that more centralized control may be required.

22. Ibid.

23. U.S. Air Force, *Command and Control. Air Force Doctrine Document 6-0* (Washington D.C.: Headquarters, Department of the Air Force, 1 June 2007), 7.

24. Ibid.

25. Ibid.

26. U.S. Navy, *Naval Warfare, Naval Doctrinal Publication (NDP) 1* (Washington, D.C.: Headquarters, U.S. Department of the Navy, CNO, March 2010), 44-45.

27. David Alberts and Richard E. Hayes, *Command Arrangements for Peace Operations* (Washington D.C.: CCRP Publication Series, 1995), 4. For the purposes of this paper, control and *command and control* are used synonymously with command. A full development of all the nuances and tasks associated with what has been traditionally called the 'science of control' and the 'art of command' are beyond the scope of this paper. Alberts and Hayes document that the term 'command and control' emerged after World War II and there are likely two reasons for this: first it could be due to the increased reliance on hardware on the battlefield and the need to "command men and control machines" and the second reason recognizes that as the chaos and complexity of the modern battlefield increases that command is much more difficult and "people must concentrate on control"; U.S. Navy, *Naval Command and Control. Naval Doctrinal Publication (NDP) 6* (Washington, D.C.: Headquarters, U.S. Department of the Navy, CNO, 19 May 1995), 26.

28. U.S. Navy, *Naval Command and Control. Naval Doctrinal Publication (NDP) 6* (Washington, D.C.: Headquarters, U.S. Department of the Navy, CNO, 19 May 1995), 26.

29. Ibid.

30. Ibid., 27.

31. Ibid.

32. U.S. Navy, *Composite Warfare Commander Doctrine, Naval Warfare Publication (NWP) 3-56* (Washington, D.C.: CNO, September 2010).

33. U.S. Marine Corps. *Command and Control. Marine Corps Doctrinal Publication 6* (Washington, D.C.: Headquarters U.S. Marine Corps, October 1996), 77.

34. Ibid., 77-9.

35. Ibid., 109. MCDP 6 is explicit that "our approach should be based on mission command and control." However, it further recognizes that there may be unique requirements that will force an adjustment to C2.

36. Ibid., 109. Marine Corps doctrine discusses *mission tactics* in both MCDP 1 and MCDP 6. Marine Corps doctrine in these sources defines mission tactics as the "tactics of assigning a subordinate mission without specifying how the mission must be accomplished."

37. U.S. Marine Corps, *Warfighting. Marine Corps Doctrinal Publication 1*, (Washington, D.C.: Headquarters U.S. Marine Corps, June 1997), 80.

38. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Vision 2020* (Washington, D.C.: CJCS, 10 September 2012), 5.

39. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Mission Command White Paper*, 3.

40. David Alberts and Richard E. Hayes, *Command Arrangements for Peace Operations*, 67.

41. Ibid., 68 and 74.

42. Ibid., 68.

43. Modified from David Alberts and Richard E. Hayes, *Command Arrangements for Peace Operations* (Washington D.C.: CCRP Publication Series, 1995), 68 and 74. Alberts and Hayes note that the very high requirements for frequency of updates in the selective control and interventionist approaches are required in order for higher headquarters to effectively intervene.

44. Ibid., 69.

45. Ibid., 66.

46. Ibid., 69.

47. Ibid., 71.

48. Ibid., 70.

49. Ibid., 70. Alberts and Hayes note that British plans for an operation tended to be much less detailed, citing often by a factor of three.

50. Ibid., 71.

51. Ibid.

52. Ibid., 72.

53. Ibid., 67.

54. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Joint Operations. Joint Publication (JP) 3-0* (Washington, D.C.: CJCS, 11 August 2011), II-2.

55. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Joint Operations. Joint Publication (JP) 3-0*, III-3. Joint doctrine includes other authorities such as administrative control, coordinating authority, and direct liaison authorized.

56. Ibid., III-6. JP 3-0 states "the land and maritime component commanders are the supported commanders within their area of operations (AOs)" but that "the JFACC is normally the supported commander for the JFC's overall air interdiction effort while the JFLCCs and JFMCCs are supported commanders for interdiction in their AOs."

57. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Joint Operational Access Concept (JOAC). Version 1.0* (Washington, D.C.: CJCS, 17 January 2012), 4. The JOAC discusses Air-Sea battle as a limited concept to address AA/AD challenges through the integration of air and naval forces.

58. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Joint Operations. Joint Publication (JP) 3-0*, III-7. "A supported JFC normally designates a SCA to coordinate joint space operations and integrate space capabilities."

59. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Space Operations. Joint Publication 3-14* (Washington, D.C.: CJCS, 06 January 2009), III-2.

60. Martin Van Creveld, *Command in War* (Cambridge: Harvard University Press, 1985), 264.

61. Ibid., 270. Van Creveld states that "the realization that certainty is the product of time as well as of information, and the consequent willingness to do with less of the latter in order to save the former; the postulation by higher headquarters of minimum, rather than maximum, objectives; the freedom granted junior commanders to select their own way to the

objective in accordance with the situation on the spot, thus cutting down on the amount of data processing required; and the willingness of superior headquarters to refrain from ordering about their subordinates—all these are indispensable elements of what the Germans, following the tradition of Scharnhorst and Moltke, call *Auftragstaktik*, or mission-oriented command system."

62. Milan N. Vego, *Joint Operational Warfare: Theory and Practice*, III-65. The three traditional operational factors in the study of operational art are space, force, and time. Milan Vego has stated that there are some who think that information should become an operational factor. Regardless, Vego's assertion concerning how the lack of information cannot be balanced by the other factors recognizes a unique status of information in the operational art, and by extension, command and control.

63. U.S. Office of the Chairman of the Joint Chiefs of Staff, *Joint Operational Access Concept (JOAC) Version 1.0*, 16-7. The JOAC claims that cross-domain synergy "requires the integration across domains without regard for which service provides the action or capability," and that this will likely result in greater joint integration at much lower echelons. The JOAC suggests that a future military organization may take the form of "combined arms to multiple services." Much thought needs to be conducted on how best to build and command such organizations as each instance would likely be unique to the circumstances upon which it was created.

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